SPECTROSCOPIA MOLECULAR

UN PERIODICO DE NOVAS E INFORMATIONES DE INTERESSE E VALOR AL SPECTROSCOPISTAS

Publicate in interlingua per Forrest F. Cleveland, Professor de Physica, Instituto Technologic de Illinois, Chicago 16. Consiliero linguistic, Dr. A. Gode, Division de Interlingua, Science Service, 80 East 11th St., New York 3. 12 numeros per anno, $2.25. Le periodico depende de receptas financiari ab illes qui beneficia de illo.

Volumine 7 | Maio 1958 | Numero 73

CONFERENTIA DEL ASSOCIATION SPECTROSCOPIC DEL WEST

A n n P a l m
Division de Chimia, Laboratorio de Radiation
Universitate California
Cassa Postal 808, Livermore, California
Statos Unite de America

DURANTE QUE le ventos glacial del hiberno propelleva se a transverso le plus grande parte del Statos Unite, le Association Spectroscopic del West teneva su assemblea annue le 6 e 7 de februario al multo scenic Asilomar in California. Isto es situate super le peninsula Monterey le qual es famose pro su climate agradabile, un distinction que pote esser attestate per le 80 participantes in le conferentia. Le majoritate del auditores convergeva verso Asilomar ab le region presso a San Francisco e Los Angeles, sed le parlatores arrivava ab placias tanto distante como le universitates Chicago, Purdue, e Duke, e le stato de Texas.

Omne Discursos Esseva Invitate

Le programma includeva solmente discursos invitate. De istos, 2 esseva presentate in le matino e 2 in le postmeridie. Il habeva assi un tempore ample pro discussiones que a vices deveniva vive e provocative sed esseva, nonobstante, multo appreciate per le auditores tanto como per le parlatores.

Le themas discutite includeva le spectroscopia infrarubie, in particu-

GEMMA DE SAGESSA

PAUC SUPERSTITIONES ha minus base scientific que le snobismo. Que alicuno reclamarea privilegios special a causa qui ille esseva nascite in un certe classe es ridicule. Si ille es de facto innatemente superior, tunc su superioritate deberea manifestar se sin le necessitate de privilegios.

-- BAKER, Le Vita Scientific.

lar "Le analyse del spectros vibrational de paraffines normal a longe catenas e de puritate de 99,5% in le stato crystallin" presentate per F. G. Snyder. Per medio de un simple tractamento dynamic, ille explicava le duplar del bandas que corresponde al motiones de cunar (rocking) e flabellar (wagging) como effectos del copulation intermolecular e intramolecular, e monstrava que le distribution del frequentias vibrational pote esser exprimite como un function del differentia de phase del oscillatores adjacente in le catena.

Un analyse general de moleculas grande esseva date per W. F. Edgell, qui quando questionate in re le sorta de moleculas grande includite in su discussion, respondeva: "omne illos que pote esser tractate convenibilemente per LE methodo de vibrationes characteristic".

Spectros Microundic

W. Gordy discuteva le spectros microundic in le region ubi le longitude de unda es del ordine de millimetros o minus. Secundo ille, le technicas de iste region es potentialmente usabile pro determinationes del momentos de nucleos rar e radioactive, pro investigationes atmospheric, e pro studios del resonantia electronic, del transitiones paramagnetic e antiferromagnetic, e del absorption dielectric in liquidos e solidos.

Resonantia Magnetic

H. M. McConnell in su discurso super le "Structura electronic de radicales a electrones pi per uso del resonantia paramagnetic" accentuava le informationes importante obtenibile ex studios per le resonantia magnetic del interactiones hyperfin de electrones e nucleos. Particularmente, le structura hyperfin de protones aromatic pote esser usate pro mesurar le densitate electronic al atomos de carbon per uso del equation approximative

$$a_j = Q\,p_j,$$

ubi a_j es le structura hyperfin in gauss, p_j es le densitate de electrones imparate al atomo C, e Q es un constante.

Adsorption Super Solidos

Le thema de adsorption molecular super solidos esseva discutite per J. R. Zimmerman e per W. A. Pliskin. Le prime reportava resultatos obtenite per le resonantia magnetic nucleari, durante que le secunde demonstrava effectos chimic observate per le spectroscopia infrarubie.

Le aspectos marginal del spectroscopia esseva coperite per J. O. Rasmussen in su discurso super le "spectroscopia nucleari". Iste discurso concerne se con le transitiones de nucleos spheroidal.

Photoionisation

M. G. Inghram revideva su recerca in le campo de "studios del photoionisation de moleculas per uso de un spectrometro de massa." Ille presentava datos obtenite in conjunction con un monochromator ultraviolette evacuate super le efficientia del photoionisation pro le ione parental e fragmentari.

Le conferentia esseva concludite per un breve discurso per J. Shoolery super le plus recente disveloppamentos experimental in le campo del resonantia magnetic nucleari a alte resolution. Plure resultatos usabile in le determination del structuras de moleculas organic complexe ha jam essite obtenite per usar le campos magnetic de 14000 gauss e frequentias de 60 mHz (mc/s). ♁

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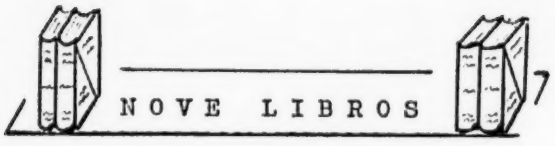
DEBEREA VOS proponer le acquisition de SM per vostre bibliotheca? ♁



• Quantum Mechanics of One- and Two-Electron Atoms (Le Mechanica Quantic de Atomes con Un e Duo Electrones). H. A. BETHE e E. E. SALPETER. Academic Press, 111 5th Ave., New York 3; 1958. Ps. 368. $10.00.

ISTE VOLUMINE es designate pro servir como un obra de referentia super calculationes que pertine a atomos simile a H e He e lor comparation con le experimentos. Illo deberea esser etiam de valor pro studentes qui desira comprehender le mechanica quantic applicate.

Tractate es le atomos H e He sin campos externe, atomos in campos externe, e le interaction de atomos con le radiation electromagnetic.

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• Growth of Crystals (Le Crescimento de Crystallos). A. V. SHUBNIKOV, Redactor principal. Consultants Bureau, Inc., 227 W. 17th St., New York 11; 1958. Ps. 294. $15.00.

ISTE LIBRO contine traductiones in anglese de 43 del 83 reportos presentate al prime convention super le crescimento de crystallos. Isto esseva tenite ab le 5 al 10 de martio 1956 al Instituto de Crystallographia del Academia de Scientias del URSS in Moscova. Plus que 400 participantes esseva presente a iste assemblea. Le attention principal esseva dedicate al crescimento de crystallos singule.

Problemas in re le formation de crystallos es de grande interesse in le scientia e le technologia. Le physica moderne del stato solide (piezo- e ferro-electricitate, ferromagnetismo, luminescentia, photoelectricitate, semiconduction, e le optica de nove medios crystallin) es intimemente connectite con le studio e le uso de crystallos grande e uniforme. Le crescimento de tal crystallos demanda un studio multilatere e intense del processos de crystallisation. Studios de crystallos etiam es de importantia in le biologia, particularmente in le virologia.

Le libro esseva compilate per I. S. Zeludev e L. A. Shuvalov.

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• Electroforming of Waveguide Components for the Millimeter-Wavelength Range (Le Electroformar del Componentes de Guidas de Undas pro le Region Ubi le Longitude de Unda es Circa Un Millimetro). ALBERT A. FELDMAN. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.; 1957. Ps. 16. $0.15 ($0.19 extra le Statos Unite de America).

ISTE PARVE libro discute le proceduras e le materias necessari pro le production de componentes de alte qualitate con un minimum de equipamento, tempore, o saper specialisate de electrodeposition.

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• Spectrum of Atomic Hydrogen (Le Spectro de Hydrogeno Atomic). G. W. SERIES. Oxford University Press, 114 5th Ave., New York 11; 1958. Ps. 88. $2.00.

LE SIMPLICITATE del atomo de hydrogeno face su spectro importante pro probar le theorias del structura atomic. Iste libro describe le formulationes successive del theoria quantic e monstra quanto intimemente istos ha essite connectite con le studio experimental del spectro de hydrogeno.

Le parte principal del libro es dedicate al labor recente. Le nove theoria del electrodynamica quantic es describite in un maniera convenibile pro le nonspecialista, e le predictiones de iste theoria es comparate con le cambiamentos Lamb e le structuras hyperfin in hydrogeno, deuterium, helium ionisate, e positronium.

Formulas pro computation numeric ha essite extrahite ex le litteratura recente.

Iste libro es le secunde in le nove "Bibliotheca Oxford super le Scientias Physic". ô

LE SPECTRO MICROUNDIC DE NICKEL-CYCLOPENTADIENYLO-NITROSYLO E LE CONFIGURATION DEL MOLECULA

SEPTE FREQUENTIAS rotational del molecula $C_5H_5{}^{58}NiNO$ ha essite mesurate inter 20 e 40 GHz (G = giga = 10^9, Hz = hertz = c/s) per A. P. Cox, L. F. Thomas, e J. Sheridan del departimento de chimia del Universitate Birmingham (Birmingham 15) in Anglaterra. Le molecula es strictemente un rotor symmetric.

Constantes Rotational

Le constantes rotational obtenite ex le datos es B_o = 1,25925 GHz e D_J = ca. 50 Hz. Le constante de distortion D_{JK} es multo parve, como es inferite ab le facto que le K-duplamento non pote esser resolvite, sed le valor obtenite pro B_o poterea esser un multe pauco incorrecte a causa del assumption que D_{JK} = 0.

Plure lineas de $C_5H_5{}^{60}NiNO$ etiam esseva mesurate. Pro iste isotopo, B_o = 1,25871 GHz.

Nulle structuras fin quadrupolic esseva detegite. Le distribution e le intensitates de altere gruppos de lineas es consistente con lor assignation a moleculas in statos excitate de vibrationes de flexion, como esserea expectate.

Structura del Molecula

Le spectros observate pote exister solmente si le Ni-N-O es strictemente linear e forma un axe de symmetria que es perpendicular al planos C_5 e H_5.

Pro computar distantias internucleari, le investigatores assumeva que le C_5H_5 es in un plano, que C-C = 1,40 Å, e que C-H = 1,08 Å. Tunc, si N-O = 1,10 ± 0,03 Å, C-Ni = 2,107 ∓ 0,001 Å e Ni-N = 1,676 ∓ 0,02 Å.

Plus detalios va esser publicate in Nature. Le previe recerca super compositos simile etiam es discutite. ô

LE SYMPOSIO OHIO STATE

LE SYMPOSIO Ohio State super le spectroscopia e le structura molecular va esser tenite ab le 16 al 20 de junio in Columbus. Discutite in le prime parte del septimana essera le spectroscopia electronic. Plus tarde, le spectroscopia infrarubie e microundic essera tractate.

Como in annos passate, le matinos essera dedicate al discursos invitate, le postmeridies al discursos contribuite.

Dormitorios essera disponibile a un costo de $6.00 per die pro 1 occupante o $4.00 per die pro cata un de 2 occupantes.

Il habera de novo un programma imprimite con summarios del discursos contribuite.

Discursos Invitate

Secundo le programma preliminari, le discursos invitate es le sequente:

L u n e d i
SPECTROS ELECTRONIC

- Alicun avantiamentos recente in le theoria quantic del structura molecular, R. G. PARR, Pittsburgh.
- Un thema nondum annunciate, J. R. PLATT, Chicago.
- Spectros de emission ex nitrogeno durante e post bombardamento con electrones, I. HOERL, Washington.

M a r t e d i
SPECTROS A FREQUENTIAS RADIONIC

- Recerca recente super le amplificatores appellate "Maseres," C. H. TOWNES, New York.
- Absorption acustic a resonantia magnetic nucleari, M. MENES e D. I. BOLEF, Pittsburgh.
- Dependentia de cambiamentos chimic protonic super le concentration in

mixturas de compositos aromatic, J. R. ZIMMERMAN, Dallas, Texas.

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Mercuridi
SPECTROS INFRARUBIE

• Le uso de grilliages in parve spectrometros infrarubie, R. C. LORD, Cambridge, Mass.
• Radiationes infrarubie ex le celo, E. E. BELL, Columbus.
• Datos spectral del Projecto de Recerca No. 44 del Instituto American de Petroleo: Revista e analyse, B. J. ZWOLINSKI e F. D. ROSSINI, Pittsburgh.

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Jovedi
SPECTROS RAMAN E INFRARUBIE

• Studios recente in le spectros infrarubie a alte resolution, H. C. ALLEN JR., Washington, D. C.
• Le bandas fundamental ν_2 e ν_4 in le spectros infrarubie de NH_3, J. GARING e H. H. NIELSEN, Columbus.
• Le intensitate de spectros Raman de gases con registration photoelectric, H. J. BERNSTEIN, Ottawa.

-

Venerdi
INTENSITATES DE SPECTROS INFRARUBIE

• Largessa de lineas, intensitates, e functiones de transmission pro moleculas simple, W. S. BENEDICT, Baltimore.
• Un theoria pro le frequentias e intensitates vibrational pro moleculas plus grande, W. F. EDGELL, Lafayette, Indiana.
• Interpretation theoric del intensitates del bandas vibrational rotational de moleculas diatomic, R. J. RUBIN, Washington, D. C., e R. HERMAN, Detroit.

Pro plus informationes, o pro un exemplar del programma quando isto deveni disponibile, scribe a H. Nielsen, Depto. de Physica, Univ. Ohio State, Columbus 10, Ohio, S. U. A. ó

TRADUCTIONES RUSSE

LE JURE MUNDIAL exclusive pro traducer in anglese e pro republication de 20 jornales russe scientific e technic in forma complete ha ersite assignate a Consultants Bureau (227 W. 17th St., New York 11, N. Y., S.U.A.) per Mezhdunarodnaya Kniga, le agentia russe pro le exportation de publicationes.

Pro informationes in re le jornales que va esser disponibile e le precios del abonamentos annue, scribe al supra date adresse.

Consultants Bureau etiam va publicar, comenciante in maio, un guida intitulate "Express Contents of Soviet Journals." Isto continera titulos in anglese de omne articulos que appare in le plus recente numeros del 39 jornales russe que es nunc currentemente traducite in anglese. Le precio de abonamento a iste guida mensual es $25.00 per anno. ó

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S. SUNDARAM del Instituto Technologic de Illinois dava un discurso super le spectroscopia vibrational al seminario de chimia al Universitate De Paul in Chicago le 14 de martio. Discutite esseva varie aspectos del spectroscopia Raman e infrarubie de interesse a physicos e chimistas, includente tal themas como le determination de structuras, campos de fortia, amplitudes medie del vibrationes in moleculas polyatomic, calculation del momentos ligaminic e lor derivatos, ligage hydrogenic, e association molecular. (Reportate per E. A. Piotrowski.) ó

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C. A. COULSON del Universitate Oxford dara le conferentias Baker in le chimia al Universitate Cornell a Ithaca in New York durante le primavera de 1959. ó

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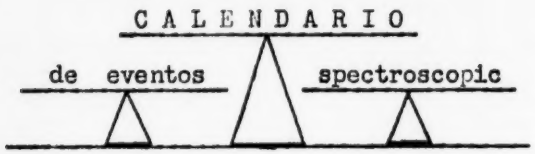
M. G. INGHRAM discuteva le combination de un spectrometro de massa con un monochromator ultraviolette evacuate pro studiar le photodissociation de moleculas in Chicago le 11 de martio.



• MAIO 7. Societate pro le Spectroscopia Applicate, New York. Spectroscopia con scrutinio rapide, J. F. Tyroler. (C. A. Jedlica, Lucius Pitkin, Inc., 47 Fulton St., New York 38, N. Y., S.U.A.)

• JUNIO 9-11. Symposio annue de spectroscopia, Association American de Spectrographos. Pick-Congress Hotel, Chicago. (H. J. Hettel, Armour Research Foundation, 10 W. 35th St., Chicago 16, Illinois, S.U.A.)

• JUNIO 16-20. Symposio super le spectroscopia molecular. Columbus, O. (H. H. Nielsen, Depto. de Physica, Univ. Ohio State, Columbus 10, Ohio.)

• JUNIO. Curso laboratorial super le spectroscopia infrarubie applicate. Instituto Polytechnic de Brooklyn, Brooklyn, N.Y., S.U.A.

• JUNIO 30-JULIO 8. Colloquio super atomos e moleculas ex le recerca radioelectric. (R. Freymann, Univ. Rennes, Francia; J. G. Powles, Depto. de Physica, Collegio Queen Mary, London E.1, Anglaterra.)

• JULIO 7-11. Colloquio annue del gruppo pro le studio de atomos e moleculas per le recerca radioelectric. (Secretariato, Gruppo Ampere, Instituto de Physica, Univ. Geneva, Bd D' Yvoy, Geneva, Switza.)

• AUGUSTO 4-8. Curso in le technicas del spectroscopia infrarubie, e

• AUGUSTO 11-15. Curso in le applicationes del spectroscopia infrarubie. Cambridge, Mass. (J. M. Austin, Instituto Technologic de Massachusetts, Cambridge 39, Mass., S.U.A.)

• AUGUSTO 13-20. Assemblea general del Union International de Astronomia e assemblea 1 9 5 8 del Commission Juncte de Spectroscopia, Moscova. Vide p. 4. (P. F. A. Klinkenberg, Laboratorio Zeeman, Muidergracht 4, Amsterdam-C, Hollanda.)

• AUGUSTO 18-22. Conferentia Gordon super le spectroscopia infrarubie. Academia Kimball Union, Meriden, New Hampshire. (W. G. Parks, Depto. de Chimia, Univ. Rhode Island, Kingston, R. I., S.U.A. Post le 9 de junio usque a augusto 29, le adresse de Dr. Parks essera Collegio Junior Colby, New London, N. H., S.U.A.)

• AUGUSTO 25-29. Instituto annue de spectroscopia infrarubie, Univ. Fisk, Nashville. (N. Fuson, Depto. de Physica, Univ. Fisk, Nashville 8, Tenn.)

• SEPTEMBRE 8-12. Colloquio international de spectroscopia. Liege, Belgica. (Association de Ingenieros del Univ. Liege, 22 rue Forgeur, Liege, Belgica.)

• SEPTEMBRE 15-17. Symposio Ottawa del Association Canadian de Spectroscopia Applicate. (N. Tomingas, Canadian Copper Refiners, Cassa Postal 338, Place d'Armes, Montreal, Quebec.)

• OCTOBRE. Symposio super le spectroscopia Raman e infrarubie. Univ. Kyoto, Japon. (Y. Morino, Univ. Tokio, Tokio, Japon.)

• OCTOBRE. Symposio super le chimia structural. Univ. Osaka, Japon. (Y. Morino, supra-date adresse.)

• JUNIO 1959. Symposio del gruppo europee del spectroscopia molecular. (R. Mecke, Depto. de Chimia Physic, Univ. Freiburg, Freiburg, Germania.)

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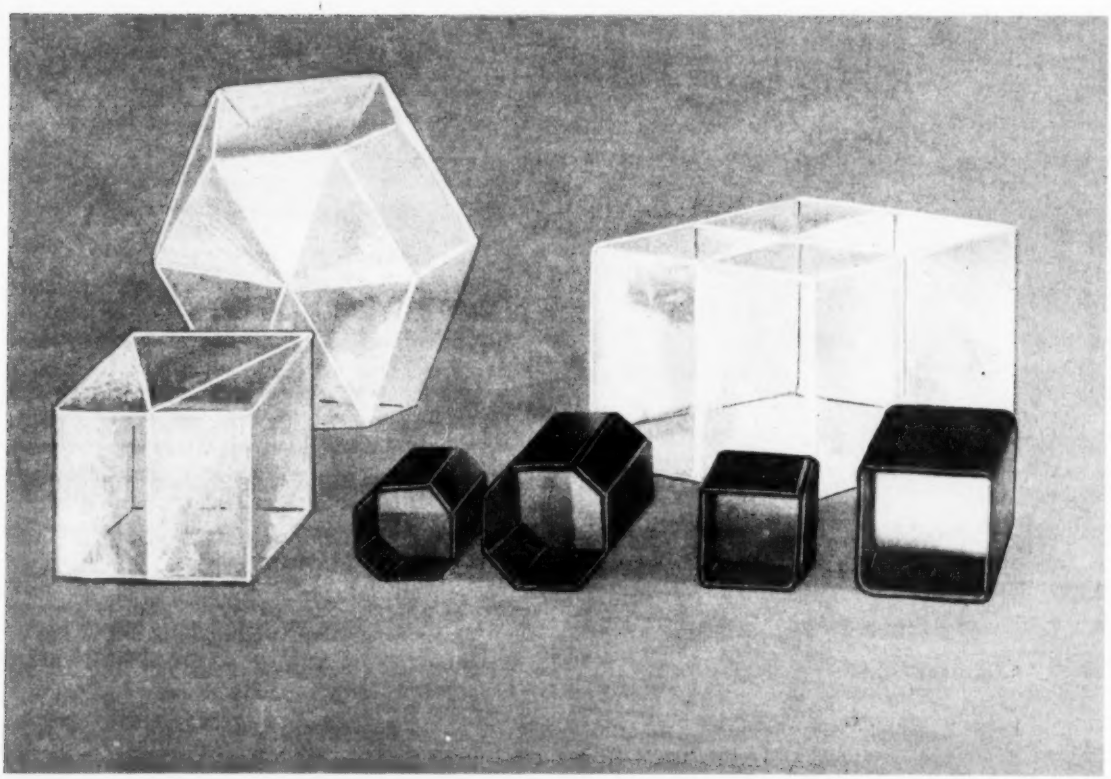
AL COMENCIAMENTO de iste anno, un nove societate pro spectroscopistas in le vicinitate del baia de San Francisco esseva fundate. Isto es appellate le "Northern California Society of Spectroscopy" (Societate de Spectroscopia del California del Nord) e include omne le spectroscopia ab le frequentias radionic al region ultraviolette, in addition al spectroscopia Raman e le spectrometria de massa. Le gruppo va convenir un vice per mense pro audir un discurso per un scientista local qui discutera su recerca recente in un del campos de spectroscopia.

(Reportate per Ann Palm.)

The Story of Lambrecht Prisms

CALCITE MINING AND CLASSIFICATION

COMPLETED PRISMS



ESTABLISHED 1933

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MODIFICATION OF POLARIZING MICROSCOPES AND ALL POLARIZING INSTRUMENTS EMPLOYING SYNTHETIC SHEET POLARIZERS.

In recent years due to the scarcity of calcite (also known as Iceland Spar), many polarizing microscopes have been manufactured employing synthetic polarizers. The advantages of polarizing prisms of calcite offering complete polarization (complete extinction) for all wave lengths transmitted are lost to the research worker attempting to investigate in a precision manner. Recently, however, large deposits of optical quality calcite have been discovered which make possible the production of high quality calcite prisms.

In the light of this availability, Karl Lambrecht is offering at reasonable cost the modification of polarizing microscopes to employ polarizing prisms. Enclosed is a photograph of a polarizing prism.

We have also available a limited amount of sensitive (first order red) wave plates. The sensitivity of such wave plates greatly exceeds that of synthetic materials. Mica wave plates are available in quarter wave retardations.

We are currently manufacturing the following polarizing instruments:

1. Babinet Compensator
2. Babinet Solid Compensator
3. Martins Photometer

A MOUNTED PRISM IN DIVIDED CIRCLE

A University of Rochester scientist says a new type of microscope is helping unlock some of the secrets of muscles.

Dr. Shinya Inoue says biochemists have discovered that the bands which make up muscle fibers "Migrate, change dimensions and merge reversibly during muscle contraction."

Dr. Inoue makes the disclosure in a paper prepared for a meeting of the Biophysical Society at the Massachusetts Institute of Technology, at Cambridge, Massachusetts.

He said the observations were made through a microscope 20 times more sensitive than previous instruments and detect phase differences of one one-billionth of an inch or 3/10 of an angstrom. Polarizing prisms go down to 2000 or less ultra violet and 2.3 microns infrared. It was built by him and the American Optical Company using Lambrecht polarizing prisms.

Polarizing prisms can now be produced which will transmit intensities of less than one part in a million in crossed orientation. This is an example of the extensive research and development that Karl Lambrecht has done.

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SUBSEQUENT TO THE PRINTING OF THE ATTACHED CIRCULAR, ADDITIONAL INFORMATION HAS BEEN OBTAINED.

Among other applications, precision calcite prisms made by Karl Lambrecht have been used for the universal polarizing microscope made jointly by American Optical Company and Dr. Shinya Inoué, a University of Rochester scientist.

With this instrument it was discovered that the bands which make up muscle fibers "migrate, change dimensions and merge reversibly during muscle contraction."

Dr. Inoué makes the disclosure in a paper presented at a meeting of the Biophysical Society at the Massachusetts Institute of Technology, at Cambridge, Massachusetts.

He said the microscope is 20 times more sensitive than previous instruments and detects phase differences of four-tenths of one-billionth of an inch or one-tenth of an angstrom. This measurement can be made on objects only two-tenths of a micron wide.

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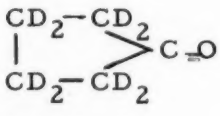
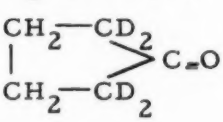
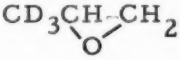
Ammonium-d_4 Bromide	ND_4Br	98	8 gm.	96.00
Ammonium-d_4 Chloride	ND_4Cl	98	5 gm.	100.00
Ammonium-d_4 Nitrate	ND_4NO_3	98	5 gm.	125.00
Ammonium-d_8 Sulphate	$(ND_4)_2SO_4$	98	8 gm.	96.00
Deuterium Bromide	DBr	99	5 l.	100.00
Deuterium Chloride	DCl	99	5 l.	100.00
Deuterium Oxide	D_2O	99.7	Price on request	
Deuterium Peroxide (30%)	D_2O_2	98	20 gm.	240.00
Nitric Acid-d (50-60% in D_2O)	DNO_3	98-99	50 cc.	400.00
Sulphuric Acid-d_2 (98%)	D_2SO_4	99	20 gm.	100.00
ORGANIC ACIDS				
Acetic Acid-d (98% in D_2O)	CH_3COOD	98	50 gm.	100.00
Acetic Acid-d (anhydrous)	CH_3COOD	98	1x 10 gm.	4.40/gm.
			3x 10 gm.	4.00/gm.
			25- 99 gm.	3.60/gm.
			100-199 gm.	3.10/gm.
			200-499 gm.	2.90/gm.
Acetic-d_3 Acid	CD_3COOH	99	10 gm.	80.00
Acetic Acid-d_4	CD_3COOD	99	1x 10 gm.	3.35/gm.
			3x 10 gm.	3.05/gm.
			25- 99 gm.	2.85/gm.
			100-199 gm.	2.60/gm.
			200-499 gm.	2.45/gm.
Adipic Acid-d_{10}	$DOOC(CD_2)_4COOD$	98	5 gm.	250.00
Butyric-d_7 Acid	$CD_3CD_2CD_2COOH$	98	5 gm.	300.00
Formic-d Acid	DCOOH	99	5 gm.	75.00
Formic Acid-d	HCOOD	99	5 gm.	50.00
Formic Acid-d_2	DCOOD	99	5 gm.	100.00

Compound	Formula	Isotopic Purity Atom % (min.)	Minimum Order Quantity	Price
Malonic Acid-d_4	$CD_2(COOD)_2$	99	50 gm.	150.00
Propionic Acid-d_6	CD_3CD_2COOD	99	5 gm.	300.00
DL-Tartaric Acid-d_6	$DOOC(CDOD)_2COOD$	95	5 gm.	325.00
ORGANIC ACID ESTERS AND SALTS				
Dimethyl-d_6 Sulphate	$(CD_3)_2SO_4$	99	10 gm.	350.00
Ethyl Acetate-d_3	$CD_3COOC_2H_5$	98	5 gm.	175.00
Ethyl-d_4 Acetate	$CH_3COOCD_2.CD_2H$	98	3 gm.	225.00
Isopropyl Acetate-d_3	$CD_3COOCH(CH_3)_2$	98	3 gm.	105.00
Isopropyl-2-d-Acetate-d_3	$CD_3COOCD(CH_3)_2$	98	2 gm.	120.00
Methyl-d_3 Acetate	CH_3COOCD_3	98	10 gm.	200.00
Methyl-d_3 Acetate-d_3	CD_3COOCD_3	98	10 gm.	270.00
Methyl Formate-d	$DCOOCH_3$	98	5 gm.	100.00
ALCOHOLS				
1-Butanol-d	$CH_3(CH_2)_3OD$	98	20 gm.	100.00
Ethanol-d	C_2H_5OD	98	20 gm.	80.00
Isobutanol-d	$(CH_3)_2CHCH_2OD$	98	20 gm.	100.00
Isopropanol-d	$(CH_3)_2CHOD$	98	20 gm.	100.00
Methanol-d	CH_3OD	99	20 gm.	60.00
Methyl-d_3 Alcohol	CD_3OH	99	5 gm.	150.00
Methanol-d_4	CD_3OD	98	5 gm.	175.00
1-Propanol-d	$CH_3CH_2CH_2OD$	98	20 gm.	100.00
Tert. Butyl-d_9 Alcohol	$(CD_3)_3COH$	99	5 gm.	100.00
ALKYL HALIDES				
1-Bromoethane-2-d	CH_2DCH_2Br	99	5 gm.	200.00
1-Bromoethane-1, 2, 2-d_3	CHD_2CHDBr	99	5 gm.	300.00
Chloroform-d	$CDCl_3$	99	50- 99 gm. 100-199 gm. 200-499 gm.	1.75/gm. 1.45/gm. 1.35/gm.
1, 2-Dibromoethane-d_4	$BrCD_2CD_2Br$	99	5 gm.	50.00
Ethyl-d_5 Bromide	CD_3CD_2Br	99	10 gm. 20 gm.	250.00 450.00
Ethyl Chloride-d	CH_2DCH_2Cl	98	5 gm.	200.00

Compound	Formula	Isotopic Purity Atom % (min.)	Minimum Order Quantity	Price
Methyl-d_3 Bromide	CD_3Br	99	10 gm. 20 gm.	180.00 305.00
Methyl-d_3 Iodide	CD_3I	99	5 gm. 10 gm.	110.00 200.00
1-Propyl-1, 1-d_2 Bromide	$CH_3CH_2CD_2Br$	98	10 gm.	250.00
1-Propyl-2, 2-d_2 Bromide	$CH_3CD_2CH_2Br$	98	10 gm.	200.00
1-Propyl-3, 3, 3-d_3 Bromide	$CD_3CH_2CH_2Br$	98	10 gm.	300.00
Tert. Butyl-d_9 Chloride	$(CD_3)_3CCl$	99	5 gm.	125.00
Trifluoromethane-d	CF_3D	98	Price on request	
ALDEHYDES and KETONES				
Acetaldehyde-d_4	CD_3CDO	99	5 gm.	200.00
Acetone-d_6	CD_3COCD_3	95	5 gm. 10 gm. 25 gm.	50.00 95.00 200.00
Acetone-d_6	CD_3COCD_3	99.5	5 gm. 10 gm. 25 gm.	65.00 115.00 250.00
Cyclopentanone-d_8		98	2 gm.	320.00
Formaldehyde-d	DCHO	99	3 gm.	120.00
Formaldehyde-d_2	DCDO	99	3 gm.	180.00
3-Pentanone-d_{10}	$C_2D_5COC_2D_5$	99	5 gm.	500.00
$\alpha,\alpha,\alpha',\alpha'$-Tetradeuterocyclopentanone		98	10 gm.	350.00
AMINO ACIDS				
Glycine-d_5	D_2NCD_2COOD	98	5 gm.	200.00
Glycine-d_2 (methylene labelled)	H_2NCD_2COOH	98	5 gm.	100.00
AMINES				
Aniline-d_7	$C_6D_5ND_2$	95	10 gm.	300.00
Hexamethylenediamine-1, 1, 6, 6-d_4	$H_2NCD_2(CH_2)_4CD_2NH_2$	96	2- 9 gm. 10- 19 gm.	80.00/gm. 55.00/gm.
Hexamethylenediamine-1, 1, 6, 6-N, N'-d_8	$D_2NCD_2(CH_2)_4CD_2ND_2$	96	2- 9 gm. 10- 19 gm.	75.00/gm. 50.00/gm.

Compound	Formula	Isotopic Purity Atom% (min.)	Minimum Order Quantity	Price
Hexamethylenediamine-d_{16}	$D_2N(CD_2)_6ND_2$	98	10 gm.	720.00
HYDROCARBONS - ALIPHATIC				
Acetylene-d_2	$DC{\equiv}CD$	96	1- 4 l.	20.00/l.
			5- 9 l.	18.00/l.
			10 l.	17.00/l.
Acetylene-d_2	$DC{\equiv}CD$	99	1- 4 l.	50.00/l.
			5- 9 l.	45.00/l.
			10 l.	42.00/l.
2, 2-Dimethyl Propane-1, 1, 1-d_3	$(CH_3)_3CCD_3$	98	2 l.	170.00
2, 2-Dimethyl-d_6 Propane-d_6 (Neopentane-d_{12})	$(CD_3)_4C$	98	1 l.	250.00
Ethane-d_1	CH_3CH_2D	98	2- 4 l.	40.00/l.
			5- 9 l.	36.00/l.
			10 l.	32.00/l.
Ethane-1, 1-d_2	CH_3CHD_2	98	2- 4 l.	50.00/l.
			5- 9 l.	45.00/l.
			10 l.	40.00/l.
Ethane-1, 2-d_2	CH_2DCH_2D	99	2- 4 l.	70.00/l.
			5- 9 l.	63.00/l.
			10 l.	57.00/l.
Ethane-1, 1, 1-d_3	CH_3CD_3	98	2- 4 l.	40.00/l.
			5- 9 l.	36.00/l.
			10 l.	32.00/l.
Ethane-1, 1, 2, 2-d_4	CHD_2CHD_2	99	1- 4 l.	120.00/l.
			5- 9 l.	108.00/l.
			10 l.	98.00/l.
Ethane-d_6	CD_3CD_3	99	1- 4 l.	125.00/l.
			5- 9 l.	112.00/l.
			10 l.	100.00/l.
Ethylene-1, 2-d_2	$CHD{=}CHD$	98	1- 4 l.	80.00/l.
			5- 9 l.	72.00/l.
			10 l.	65.00/l.
Ethylene-d_4	$CD_2{=}CD_2$	99	1- 4 l.	130.00/l.
			5- 9 l.	118.00/l.
			10 l.	106.00/l.
Methane-d_1	CH_3D	98	1- 4 l.	30.00/l.
Methane-d_2	CH_2D_2	98	5- 9 l.	27.00/l.
Methane-d_3	CHD_3	98	10 l.	24.00/l.
Methane-d_4	CD_4	99		

Compound	Formula	Isotopic Purity Atom % (min.)	Minimum Order Quantity	Price
Methyl-d_3 Acetylene	$CD_3C{\equiv}CH$	99	1 l.	120.00
Methyl Acetylene-d_4	$CD_3C{\equiv}CD$	99	1 l.	135.00
2-Methyl Propane-2-d	$(CH_3)_3CD$	98	1 l.	75.00
2-Methyl-d_3 Propane-1, 3-d_6	$(CD_3)_3CH$	98	1 l.	180.00
2-Methyl Propane-d_{10}	$(CD_3)_3CD$	98	1 l.	175.00
Propadiene-1, 1-d_2	$CH_2{=}C{=}CD_2$	99	1 l.	170.00
Propadiene-1, 3-d_2	$CHD{=}C{=}CHD$	98	1 l.	170.00
Propadiene-1, 1, 3-d_3	$CHD{=}C{=}CD_2$	98	1 l.	150.00
Propadiene-d_4	$CD_2{=}C{=}CD_2$	99	1 l.	135.00
Propane-2, 2-d_2	$CH_3CD_2CH_3$	96	1- 4 l. 5- 9 l.	60.00/l. 50.00/l.
Propene-2-d	$CH_3CD{=}CH_2$	96	1- 4 l. 5- 9 l. 10 l.	60.00/l. 55.00/l. 50.00/l.
Propene-1, 1-d_2	$CH_3CH{=}CD_2$	96	1- 4 l. 5- 9 l. 10 l.	180.00/l. 166.00/l. 153.00/l.
Propene-1, 1, 2-d_3	$CH_3CD{=}CD_2$	98	1 l.	150.00
Propene-3, 3, 3-d_3	$CD_3CH{=}CH_2$	96	1 l.	180.00
Propene-2, 3, 3, 3-d_4	$CD_3CD{=}CH_2$	96	1 l.	225.00
Propene-1, 1, 3, 3, 3-d_5	$CD_3CH{=}CD_2$	96	1 l.	135.00
Propene-d_6	$CD_3CD{=}CD_2$	98	1 l.	99.00
HYDROCARBONS - ALICYCLIC				
Cyclobutane-d_8	C_4D_8	95	Price on request	
Cyclohexane-d_{12}	C_6D_{12}	99	5 gm. 10 gm.	150.00 280.00
Cyclopentanone-d_8	C_5D_8O	98	2 gm.	320.00
Cyclopropane-d_6	C_3D_6	98	Price on request	
Methyl Cyclohexane-d_{14}	$C_6D_{11}CD_3$	99	5 gm. 10 gm.	150.00 280.00
$\alpha,\alpha,\alpha',\alpha'$-Tetradeuterocyclopentanone	$C_5H_4D_4O$	98	10 gm.	350.00
Benzene-d_1	C_6H_5D	99	5 gm.	60.00
Benzene-d_6	C_6D_6	99.5	5 gm. 10 gm. 25 gm.	85.00 161.00 382.00

Compound	Formula	Isotopic Purity Atom % (min.)	Minimum Order Quantity	Price
Diphenyl-d_{10}	$C_6D_5.C_6D_5$	98	5 gm.	100.00
α,α'-Hexadeutero-o-xylene	$C_6H_4(CD_3)_2$	98	5 gm.	300.00
α,α'-Hexadeutero-m-xylene	$C_6H_4(CD_3)_2$	98	5 gm.	200.00
α,α'-Hexadeutero-p-xylene	$C_6H_4(CD_3)_2$	98	5 gm.	200.00
Naphthalene-d_8	$C_{10}D_8$	98	5 gm.	125.00
Terphenyl-d_{14}	$C_6D_5.C_6D_4.C_6D_5$	98	5 gm.	125.00
Toluene-α-d_3	$C_6H_5.CD_3$	98	5 gm. 6- 19 gm. 20 gm.	20.00/gm. 18.00/gm. 15.00/gm.
Toluene-d_8	$C_6D_5.CD_3$	98	5 gm. 10 gm. 25 gm.	85.00 161.00 382.00
HETEROCYCLICS				
Ethylene Oxide-1, 2-d_2		98	10 gm.	350.00
Furane-d_4		98	5 gm.	150.00
Propylene Oxide-d_3		98	5 gm.	400.00
Tetradeuterofurane		98	5 gm.	225.00
MISCELLANEOUS				
Azoethane-d_{10}	$CD_3CD_2N=NCD_2CD_3$	98	Price on request	
Azoisopropane-d_{14}	$(CD_3)_2CDN=NCD(CD_3)_2$	98	Price on request	
Azomethane-d_6	$CD_3N=NCD_3$	99	Price on request	
Diethyl Ether-d_{10}	$C_2D_5.O.C_2D_5$	98	Price on request	
1, 2-Dimethyl Hydrazine-d_8	$CD_3DN.NDCD_3$	98	Price on request	
Dimethyl-d_6 Mercury	CD_3HgCD_3	98	5 gm.	200.00
Dimethyl-d_6 Sulphate	$(CD_3)_2SO_4$	99	10 gm.	350.00
Hydrazine Hydrate-d_4	$ND_2ND_2D_2O$	98	20 gm.	200.00
Hydrazine-d_4 (deuterium chloride salt)	$ND_2ND_2.2DCl$	98	5- 9 gm. 10- 19 gm. 20- 49 gm. 50- 99 gm.	35.00/gm. 25.00/gm. 20.00/gm. 17.50/gm.
Phenyl Hydrazine-d_3 (deuterium chloride salt)	$C_6H_5NDND_2.DCl$	98	5- 9 gm. 10- 19 gm. 20- 49 gm. 50- 99 gm.	35.00/gm. 25.00/gm. 20.00/gm. 17.50/gm.
Trimethyl-d_9 Aluminum	$(CD_3)_3Al$	98	Price on request	